

# Home Automation Using IoT

Maria Glennly P<sup>1</sup>, Ajith kumar T<sup>2</sup>, Arjun M Suresh<sup>3</sup>, Chandni R Nair<sup>4</sup>, Chandra kumar M<sup>5</sup>

<sup>1,2,3,4,5</sup> Dept of ECE

<sup>1,2,3,4,5</sup> Sri Eshwar College of engineering, Coimbatore.

**Abstract-** Home automation or smart home industry have seen intense growth in past years and will continue to grow in future as per market necessities and its benefits. This paper has been proposed to develop a smart home automation system which involves the controlling and automation of electrical appliances like fan, light, television and charger. The system consists of relays and switches which is connected to a Wi-Fi module and then it is linked to an android application. The android application can control the home electrical appliances even when users are away from home. This product is reasonable than the available similar products in the market and it is very useful for elderly and disabled persons.

**Keywords-** smart home, Wi-Fi module, android application

## I. INTRODUCTION

In this paper, with a vision to attaining maximized automation, an effective application for Internet of Things which is used for monitoring regular electrical appliances at low cost ubiquitous sensing system has been stated. It would effectively create a relay of equipment's that provide stimulus to each other and require the minimum human involvement. The devices are interconnected for controlling the devices by transmitting the data via internet.

The Internet of Things (IoTs) can be observed as connecting objects like smart-phones, actuators and relays to the Internet. The devices are smartly associated together allowing new methods of communication between people and things. IoT technology has provocatively improved in the last few years since it has added a new aspect to the world of communication and information technologies. It has been foreseen that the number of devices linked to the Internet will upsurge from 100.4 million in 2011 to 2.1 billion by the year 2021, this progress is at a rate of 36% per year. In the year 2011, 80% of machine to machine (M2M) networks were made over mobile networks such as 2G and 3G and it is believed that by 2025, the ratio will increase to 96% since the cost related with machine to machine over fixed networks are generally more luxurious than mobile networks. This paper mainly concentrates on the old and disabled persons. They can control the electrical appliances based on their needs without depending on others. The user can also control the electrical

appliances, even at a longer distance by connecting the mobile with an internet. This paper also plays a major role in power management. It can be done by switching the device ON only when there is a need for the devices and to turn OFF the device immediately after the need is satisfied. The proposed system also accepts the voice signal as input so that it becomes easy for the user to give input to the system.

## II. LITERATURE SURVEY

In current situation home automation system is developed using many technologies like IoT and cloud. There are many systems available in market like:

### 2.1. Smart home automation system using android application:

In this system android application is used to send signal to Wi-Fi module which is connected to Arduino. The signal from the android application is given to Arduino by Wi-Fi module for controlling appliances using relay board. In this system, it is providing restricted access to user that is limited to the same network.

### 2.2. Wi-Fi based home automation:

This is a web based home automation system in which user can interrelate with the system through a web based user interface over the Internet. The system is connected with the home appliances. The main processor Arduino interacts with external equipments through sensors, appliances and devices. The system is dedicated only to a limited network, so there will be less possibility for the loss of data. Here the system cannot be used from anywhere in the world which can be developed using web-browser or cloud.

### 2.3. Home automation system based on Wi-Fi interconnection:

The proposed system is based on the interconnection of Wi-Fi modules. Wi-Fi module will be giving commands to the smart phone which is connected as an external device. By the external device the user can communicate with the electrical appliances. There won't be any relay connections between the devices which helps in dropping the time required

in data handover and loosing of data. There would be an incessant monitoring of data that is being moved and also producing a log out of the system. Android application is being developed for a user friendly collaboration between the user and the devices. The entire system is wireless, so there won't be any loss in data to an extent and also there won't be any issue due to wiring.

### III. PROBLEM IDENTIFICATION

There are some problems identified in the existing systems which includes:

#### A. WIRING:

Due to wiring there is high possibility of loss of data, if any of the wire got cut. The installation process and the maintenance of the system is also complex.

#### B. CONNECTIVITY:

The connectivity methods like Bluetooth and zig-bee are of very short range. The user cannot control the electrical appliances at a longer range.

### IV. PROPOSED SYSTEM

The proposed system is based on the interconnection of electrical appliances with a Wi-Fi module. The Wi-Fi module is linked with an android application. The electrical appliances are connected to the Wi-Fi module through relays. The signal from the mobile application is sent to the Wi-Fi module. The Wi-Fi module sense the signals which is coming from the mobile application and then passes the signal to the relay circuit. The Wi-Fi module is linked with the mobile application through a web browser. So that the user can access the electrical devices by connecting the mobile to the internet.

#### IV. A. SYSTEM ARCHITECTURE

- i. The block diagram of the proposed system is shown in the figure 4.1.
- ii. A power supply of 12V is connected to Wi-Fi module through voltage regulator by which 12V supply is regulated to 3.3V since the maximum range of Wi-Fi module is 3.3V.
- iii. As shown in below figure 4.1 the block diagram of proposed system, the 12V supply is also given to Relay board directly which in turn is connected to the load to turn ON.
- iv. Using mobile, the user can give the voice command to recogniser used here.

- v. The IFTTT voice recogniser identifies the voice input and then passes the data to the Wi-Fi module.
- vi. The Wi-Fi module is dumped with a program which controls the relay circuit and then does the operation as per the user instruction.

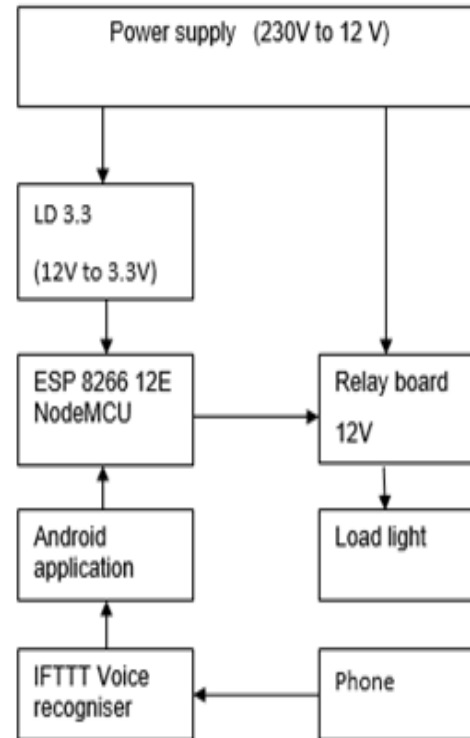


Fig 4.1 Block Diagram of the proposed system

### V. IMPLEMENTATION DETAILS

#### V.A. SOFTWARE IMPLEMENTATION:

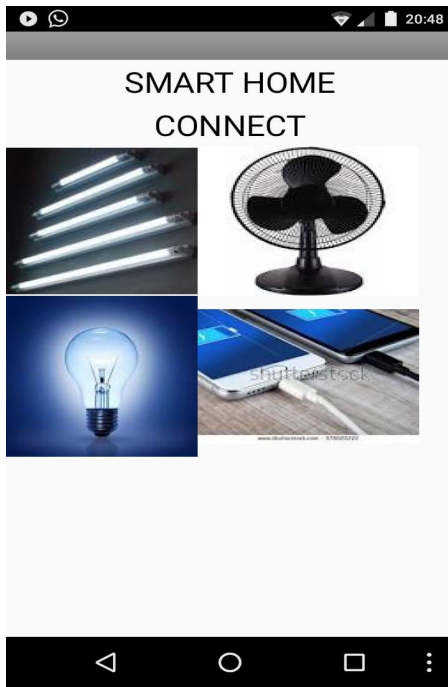


Fig 5.1 MIT App inventor display model

The android application is built using MIT app inventor, which is shown in above figure 5.1. It is an android application inventor provided by Google. For each electrical appliance there is a switch for ON/OFF control. The button is designed in such a way that gets toggled for ON/OFF process of the appliances. This is interfaced with an IFTTT voice recognizer, so that the input signal can be of audio signal. Commands are sent through the web browser object to the Wi-Fi module. It passes the commands to the web viewer through the address of the Wi-Fi network. The user commands the instruction through on/off button present near to the required load names such as fan, light, charger etc.

**V. B. HARDWARE IMPLEMENTATION:**

The picture of hardware implementation of the proposed system is shown in the figure 5.2. For hardware Implementation, system uses ESP8266 and relay board. ESP8266 is a Wi-Fi module used for the interconnection of android application. The data is passed from the phone to the Wi-Fi module which communicates with the relay board. The relay circuit controls the switching process of the electrical appliances.

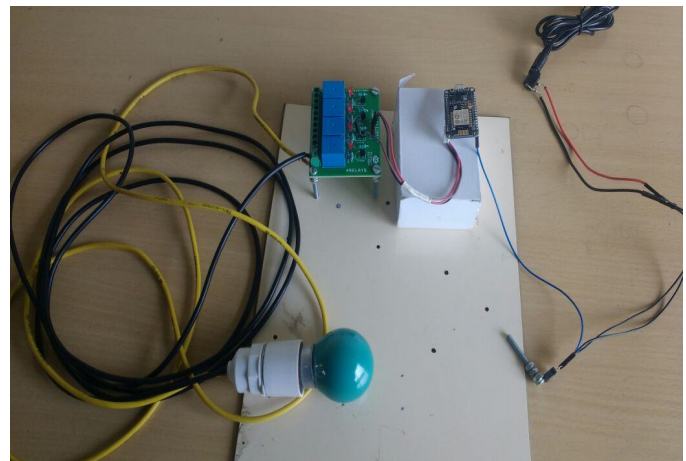


Fig 5.2 Picture of hardware implementation of the proposed system

**V.C. SIMULATED OUTPUT**

The system explained here is simulated using software known as Cisco packet tracer. In this software the devices required for the project is placed accordingly. The input given to the simulation software is shown in the figure 5.3.

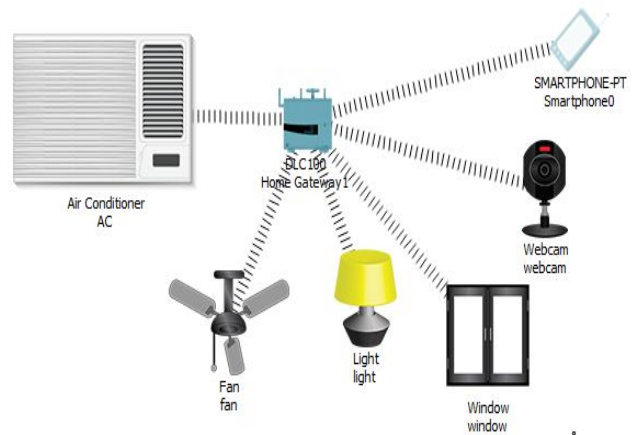


Fig 5.3 Simulation input in Cisco packet tracer

The input is given from phone to devices through gateway used here. Then the signals to the loads are transmitted from the gateway device according to the user's desire. The output of the proposed system in simulation software is shown in the figure 5.4

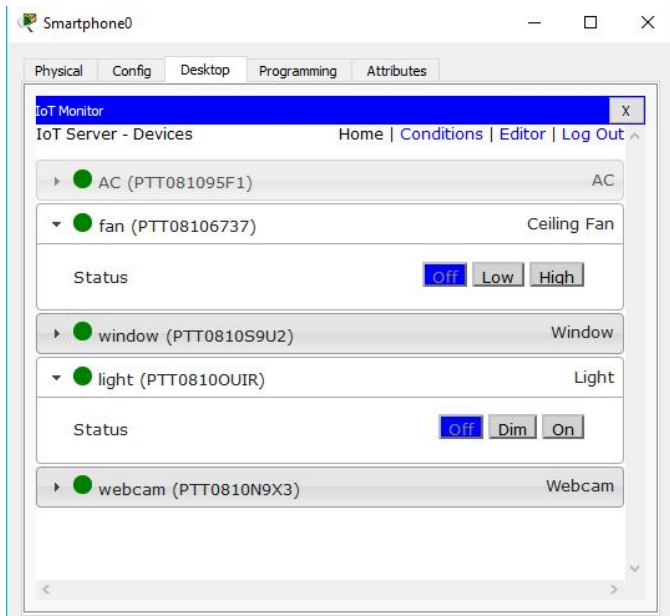


Fig 5.4 Simulated output using Cisco packet tracer

## VI. FUTURE SCOPE

The product can be further expanded by automatically turning the lights On/Off according to the brightness in the room and fan according to the room temperature.

## VII. CONCLUSION

Smart home system interlinks the electrical devices with an android application. It can control the home electrical appliances even when users are away from home. The android application and the electrical devices are user-friendly manner. It provides more flexibility to our home with an affordable cost.

## REFERENCES

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